FIG.1

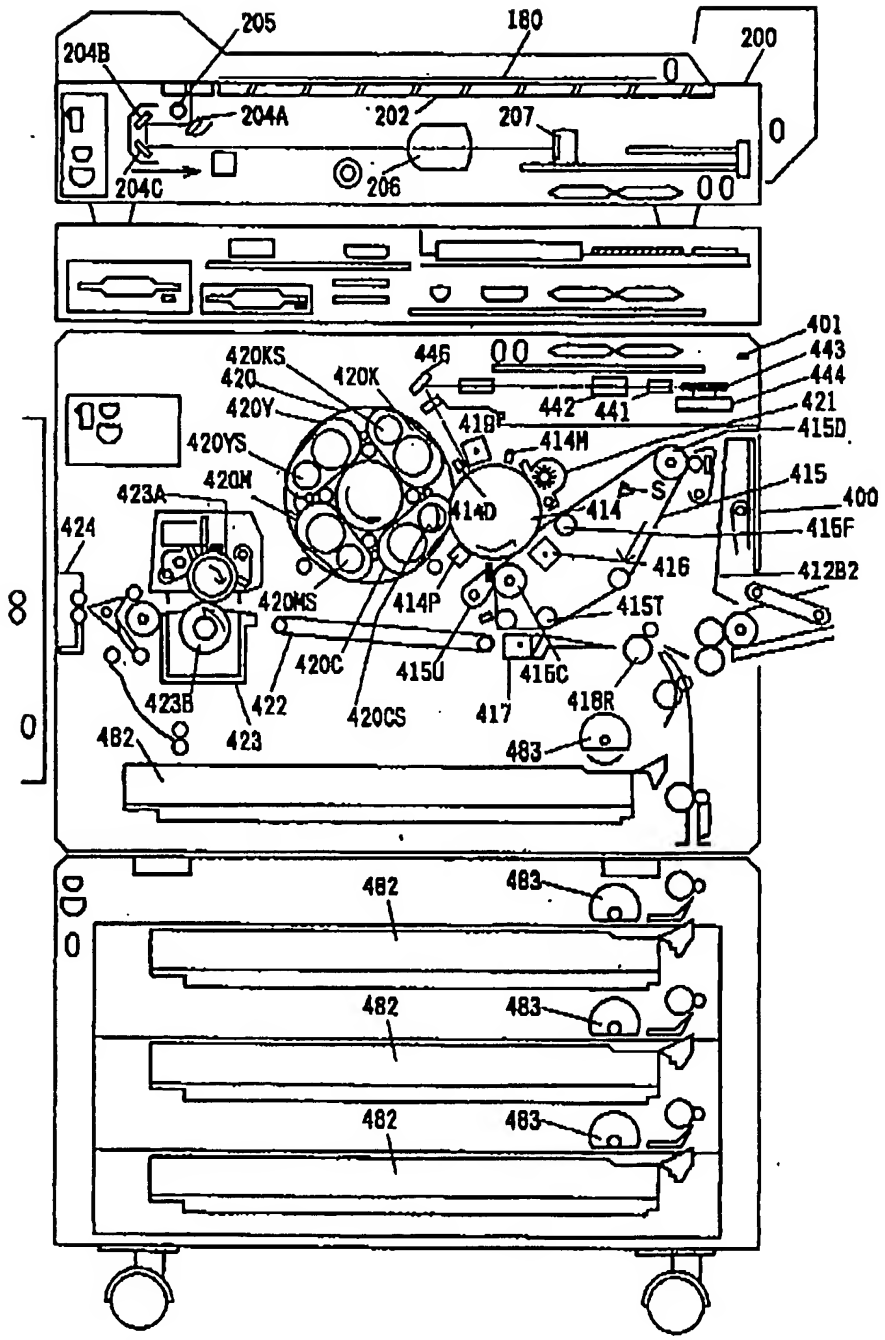

205
180
200
204B
204A
202
207
204C
206
401
443
444
421
415D
420KS
420
420K
446
420Y
442
441
418F
414H
420YS
420M
423A
414D
414
415
400
424
416F
416
412B2
420MS
414P
415T
420C
415U
416C
423B
422
420CS
417
418R
423
482
483

FIG.2

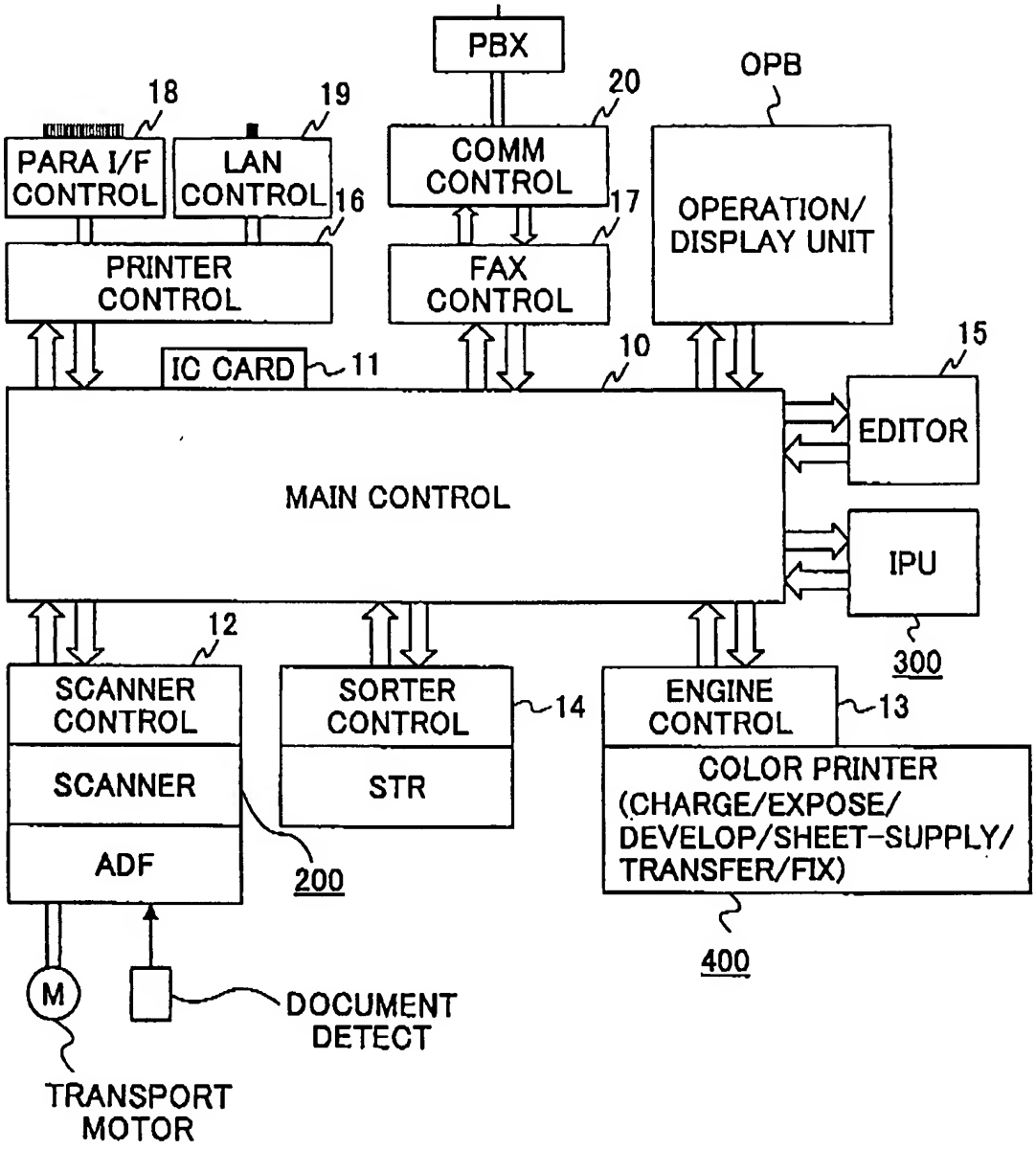

PBX
OPB
18
19
20
PARA I/F CONTROL
LAN CONTROL
COMM CONTROL
OPERATION/ DISPLAY UNIT
16
17
PRINTER CONTROL
FAX CONTROL
IC CARD
11
10
15
EDITOR
MAIN CONTROL
IPU
300
12
SCANNER CONTROL
SORTER CONTROL
14
ENGINE CONTROL
13
SCANNER
STR
COLOR PRINTER (CHARGE/EXPOSE/ DEVELOP/SHEET-SUPPLY/ TRANSFER/FIX)
ADF
200
400
M
DOCUMENT DETECT
TRANSPORT MOTOR

FIG.3

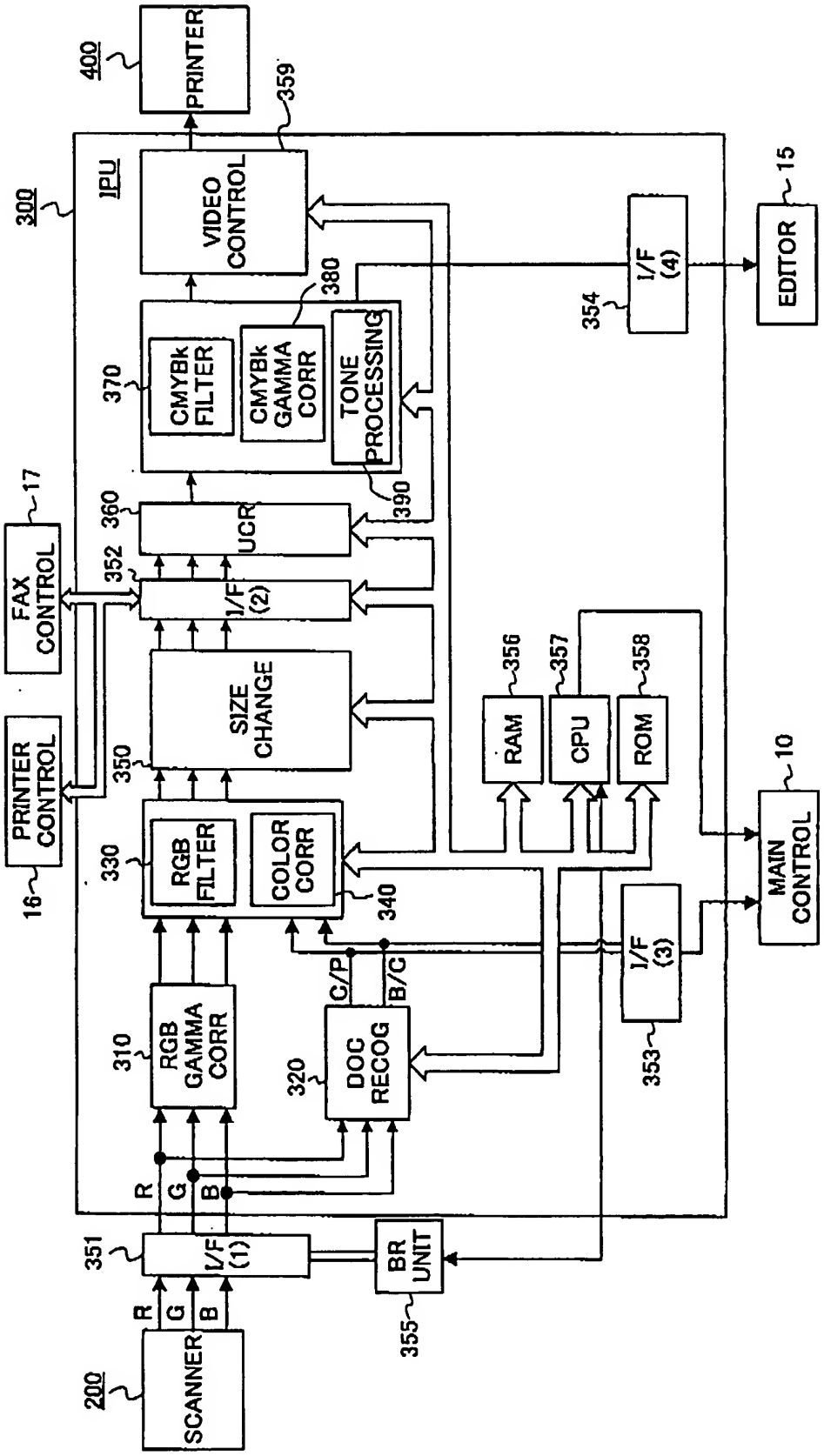

400
PRINTER
359
VIDEO CONTROL
300
IPU
380
370
CMYBk FILTER
CMYBk GAMMA CORR
TONE PROCESSING
390
360
UCR
352
I/F (2)
17
FAX CONTROL
SIZE CHANGE
350
PRINTER CONTROL
16
330
RGB FILTER
COLOR CORR
340
310
RGB GAMMA CORR
320
DOC RECOG
C/P
B/C
R
G
B
351
I/F (1)
BR UNIT
355
200
SCANNER
354
I/F (4)
15
EDITOR
356
RAM
357
CPU
358
ROM
10
MAIN CONTROL
353
I/F (3)

FIG.4

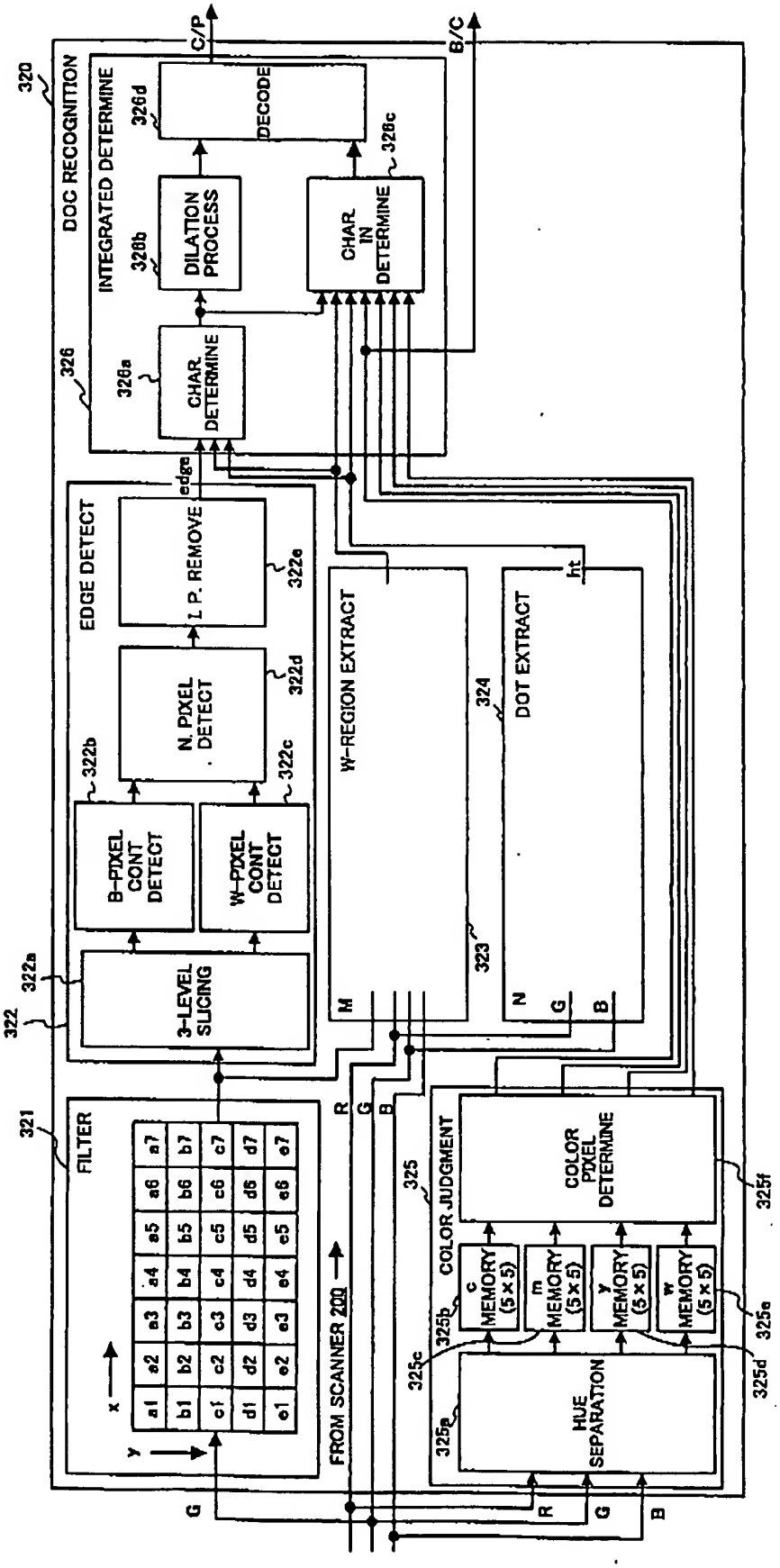

320
DOC RECOGNITION
C/P
B/C
INTEGRATED DETERMINE
326d
DECODE
326c
CHAR IN DETERMINE
326b
DILATION PROCESS
326a
CHAR. DETERMINE
326
edge
EDGE DETECT
322e
I. P. REMOVE
322d
N. PIXEL DETECT
322c
W-PIXEL CONT DETECT
322b
B-PIXEL CONT DETECT
322a
3-LEVEL SLICING
322
W-REGION EXTRACT
323
DOT EXTRACT
324
ht
M
N
G
B
321
FILTER
x
y
FROM SCANNER 200
R
G
B
325
COLOR JUDGMENT
COLOR PIXEL DETERMINE
325f
c MEMORY (5×5)
m MEMORY (5×5)
y MEMORY (5×5)
w MEMORY (5×5)
325b
325c
325d
325e
HUE SEPARATION
325a

FIG.5

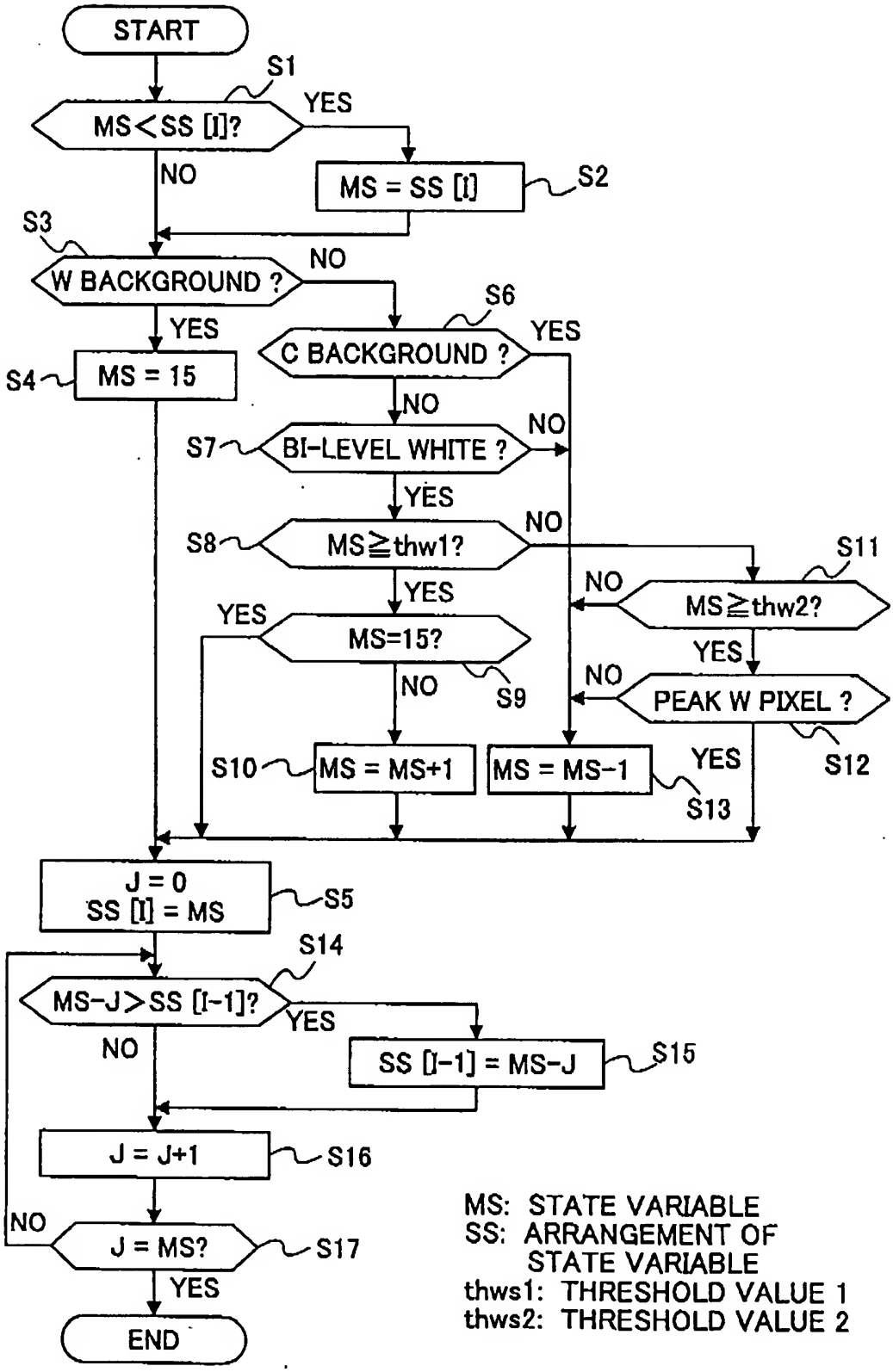

START
S1
MS<SS [I]?
YES
NO
MS = SS [I]
S2
S3
W BACKGROUND ?
NO
YES
S6
C BACKGROUND ?
YES
S4
MS = 15
NO
S7
BI-LEVEL WHITE ?
NO
YES
S8
MS≧thw1?
NO
YES
S11
NO
MS≧thw2?
YES
YES
MS=15?
NO
S9
NO
PEAK W PIXEL ?
S10
MS = MS+1
MS = MS-1
YES
S13
S12
J = 0
SS [I] = MS
S5
S14
MS-J>SS [I-1]?
YES
NO
SS [I-1] = MS-J
S15
J = J+1
S16
NO
J = MS?
S17
YES
END
MS: STATE VARIABLE
SS: ARRANGEMENT OF STATE VARIABLE
thws1: THRESHOLD VALUE 1
thws2: THRESHOLD VALUE 2

FIG.6

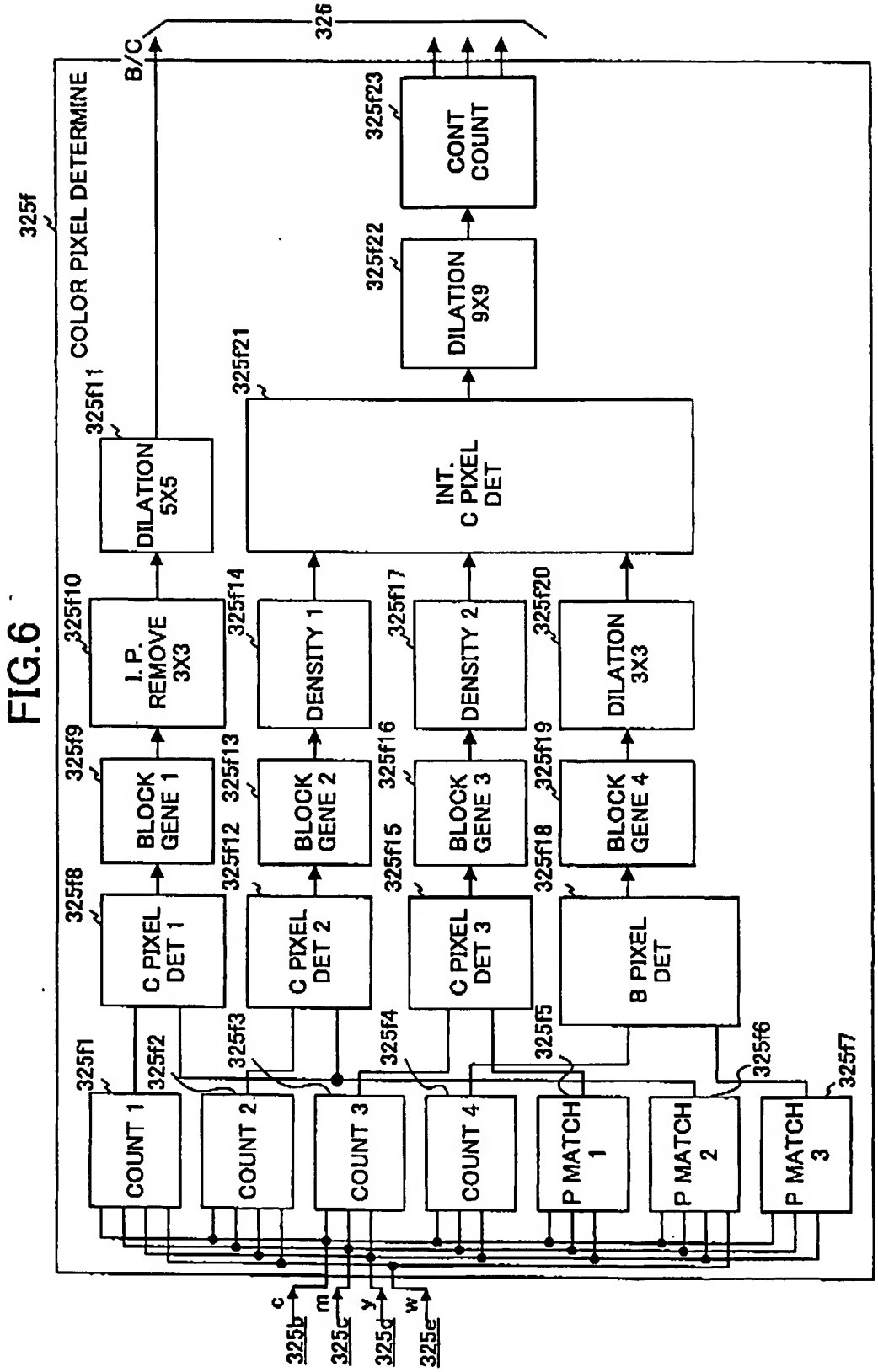
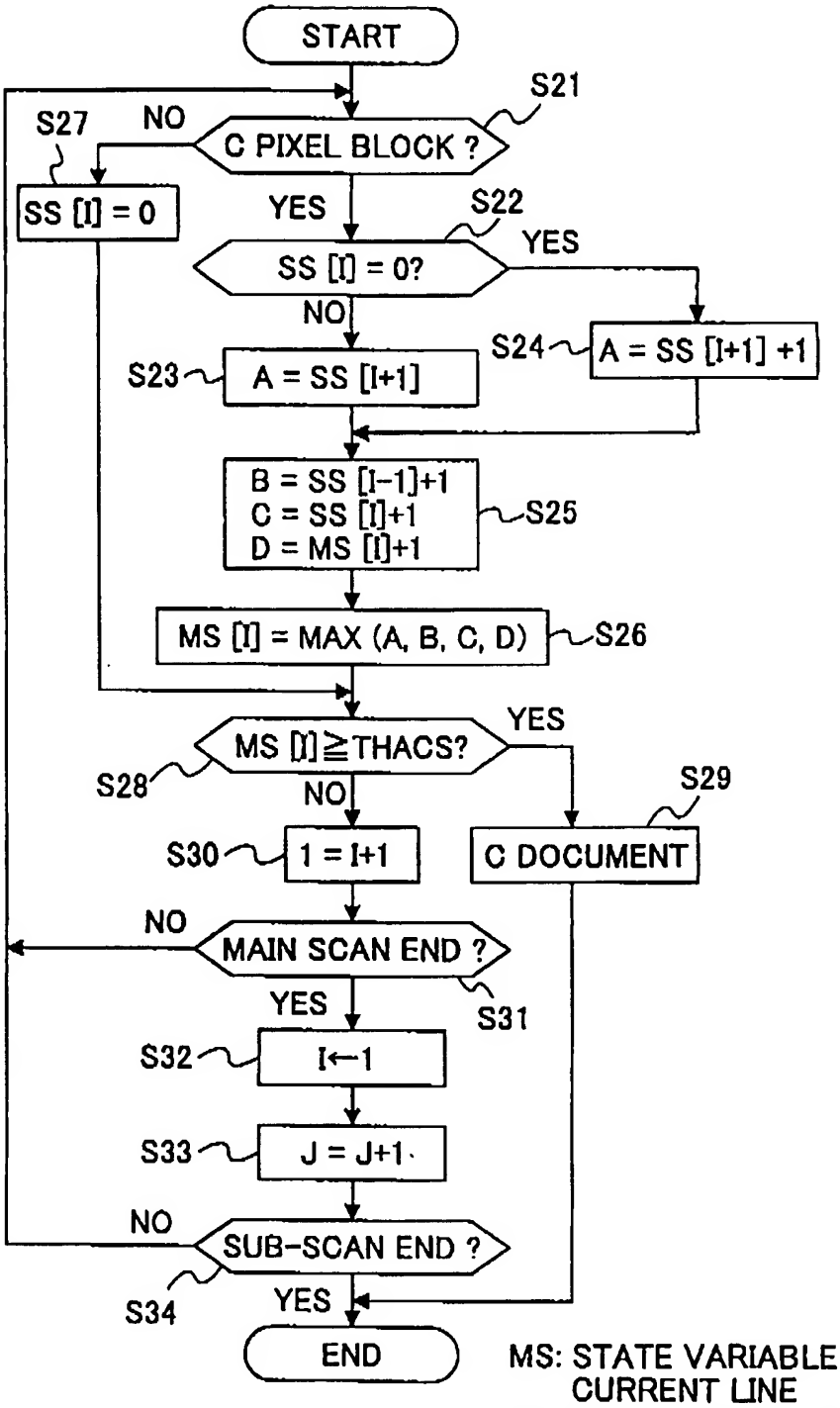
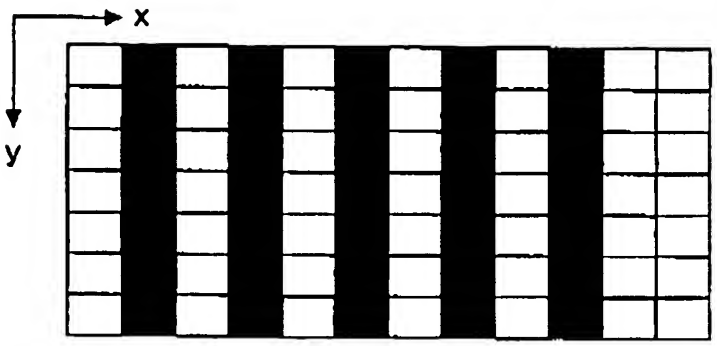

326
B/C
325f
COLOR PIXEL DETERMINE
325f11
DILATION 5X5
325f21
INT. C PIXEL DET
325f22
DILATION 9X9
325f23
CONT COUNT
325f10
I.P. REMOVE 3X3
325f14
DENSITY 1
325f17
DENSITY 2
325f20
DILATION 3X3
325f9
BLOCK GENE 1
325f13
BLOCK GENE 2
325f16
BLOCK GENE 3
325f19
BLOCK GENE 4
325f8
C PIXEL DET 1
325f12
C PIXEL DET 2
325f15
C PIXEL DET 3
325f18
B PIXEL DET
325f1
COUNT 1
325f2
COUNT 2
325f3
COUNT 3
325f4
COUNT 4
325f5
P MATCH 1
325f6
P MATCH 2
325f7
P MATCH 3
c
m
y
w
325b
325c
325d
325e

FIG.7



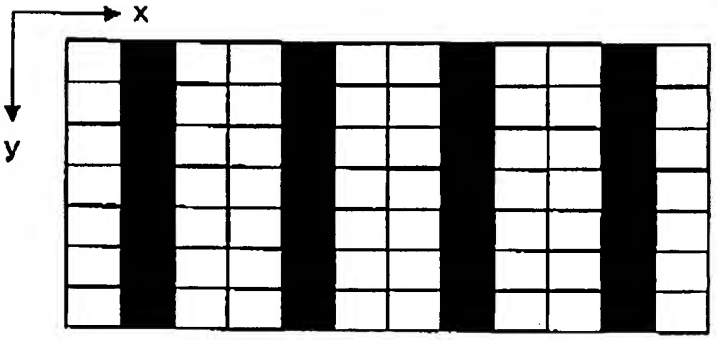
MS: STATE VARIABLE OF CURRENT LINE
SS: ARRANGEMENT OF STATE VARIABLE OF PREVIOUS LINE
I: POSITION OF PIXEL IN MAIN SCAN DIRECTION
THACS: THRESHOLD VALUE

FIG.8A



600-DPI LINE PATTERN WHEN READ AT RESOLUTION OF 600 DPI

FIG.8B



400-DPI LINE PATTERN WHEN READ AT RESOLUTION OF 600 DPI

FIG.9

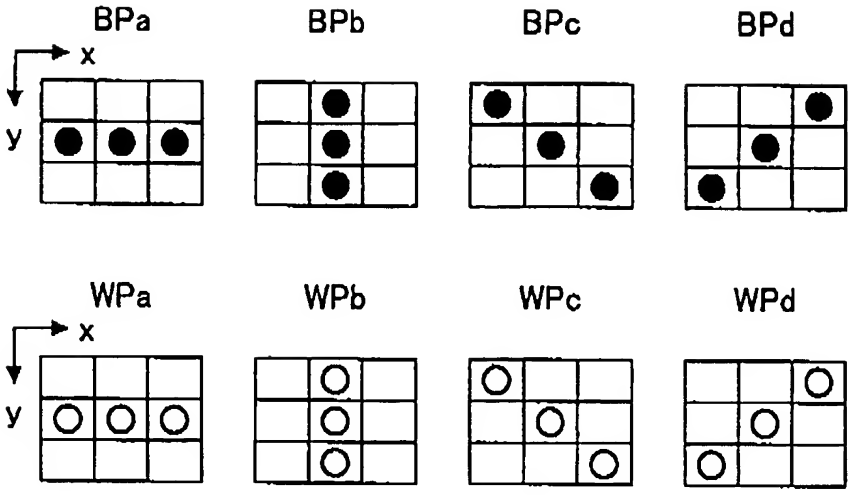


FIG.10

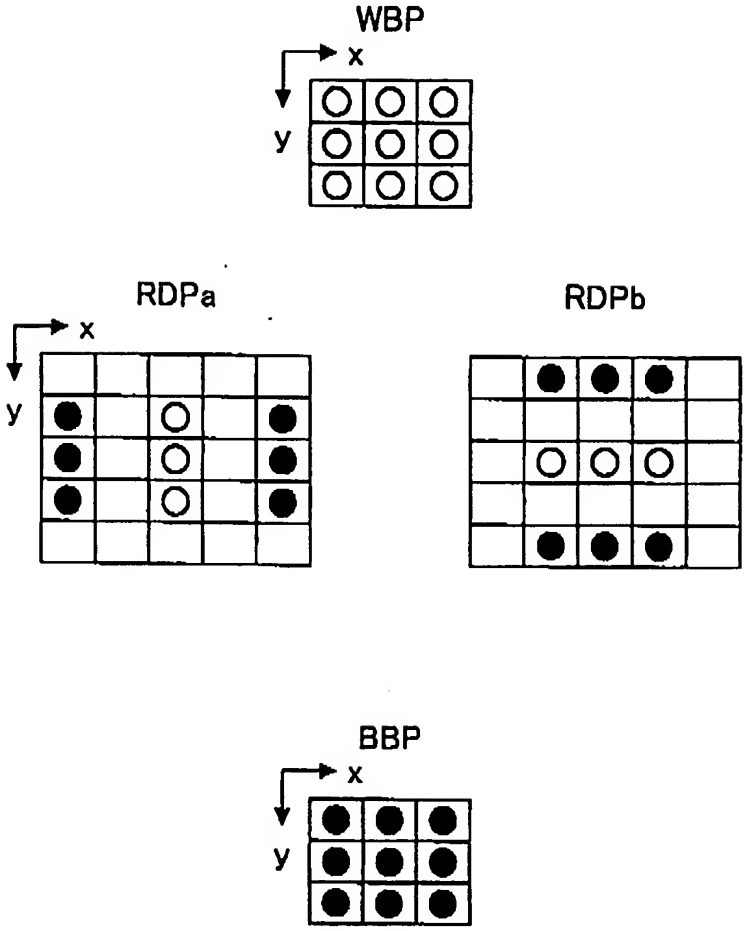


FIG.11

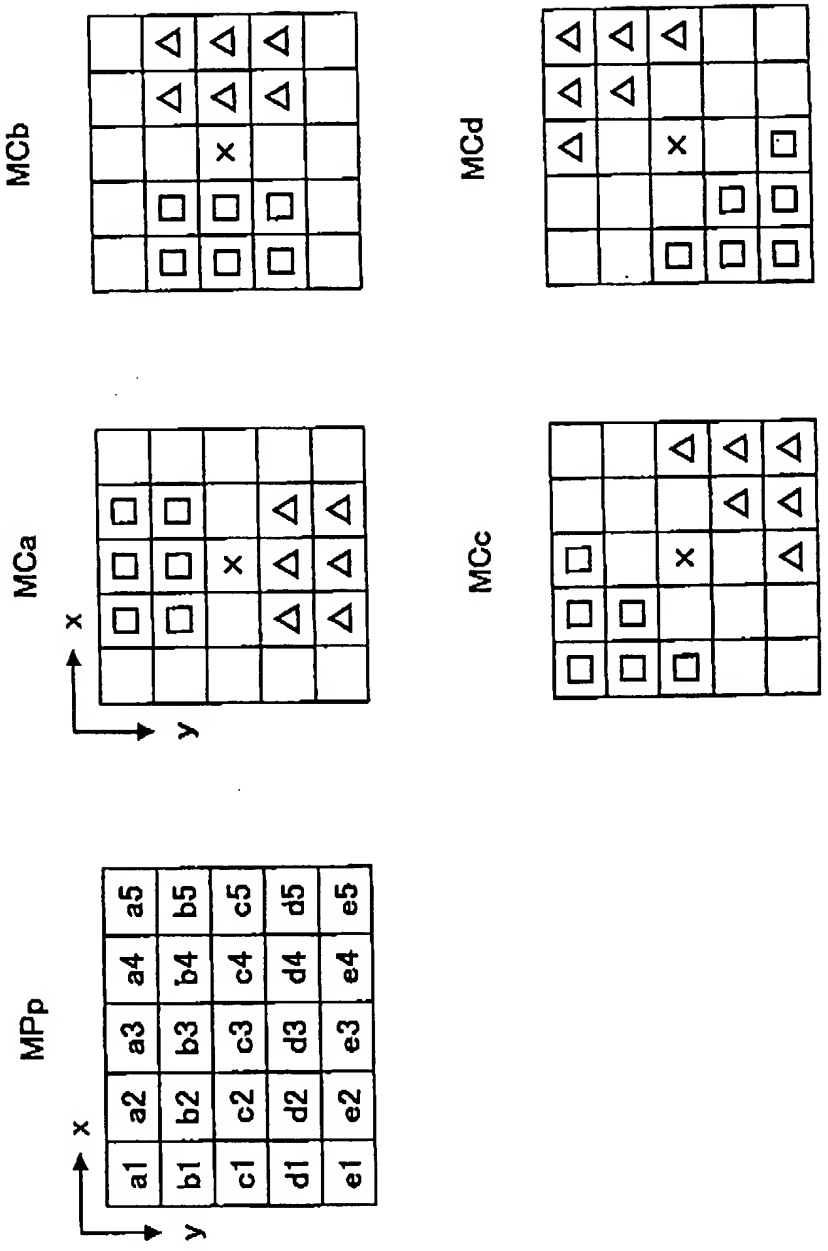

MCb
MCd
MCa
MCc
MPp
x
y
a1 a2 a3 a4 a5
b1 b2 b3 b4 b5
c1 c2 c3 c4 c5
d1 d2 d3 d4 d5
e1 e2 e3 e4 e5

FIG.12

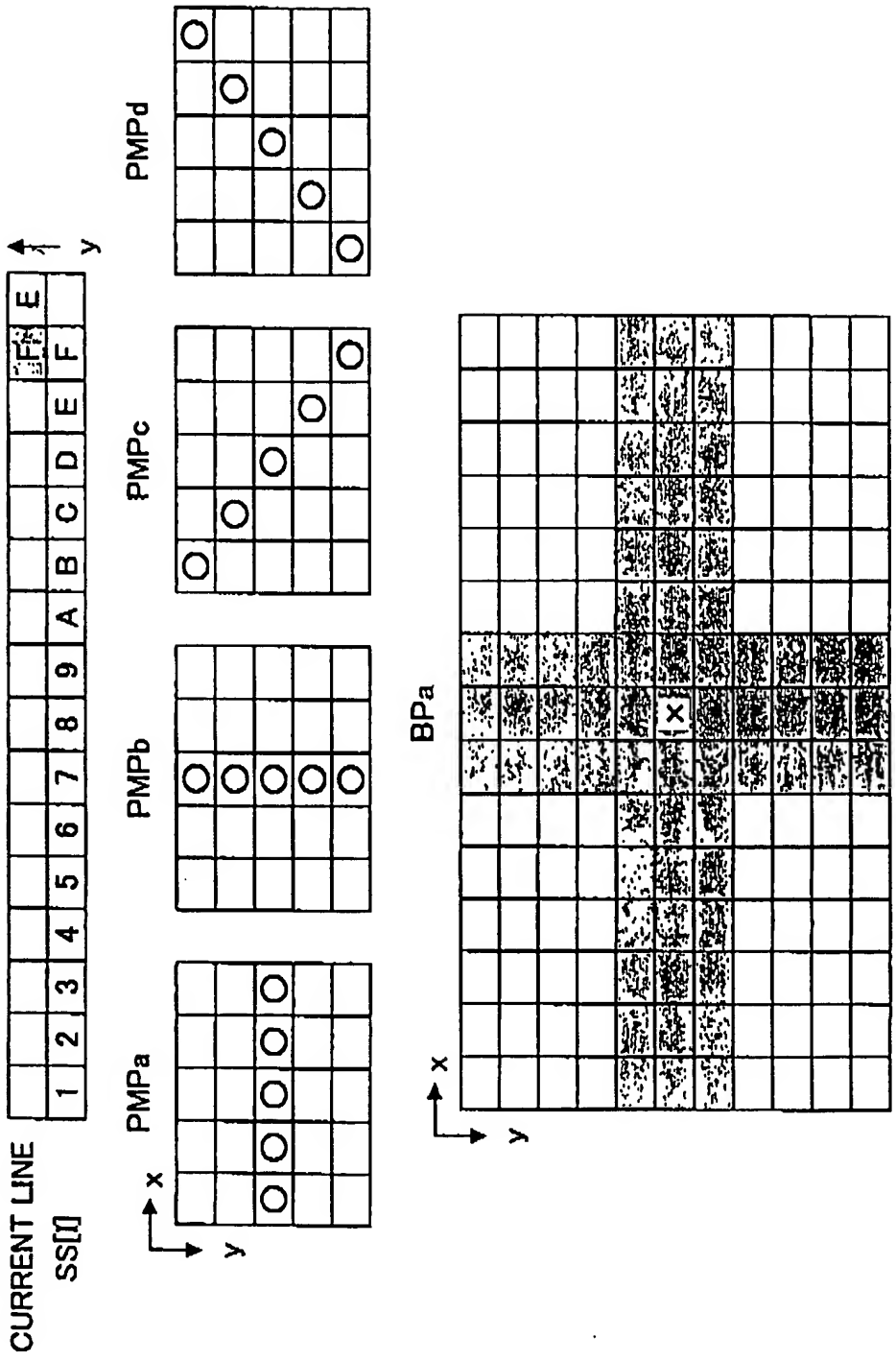

LMP
x
y
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
CURRENT LINE
SS[]
PMPa
PMPb
PMPc
PMPd
BPa
x
y

FIG.13

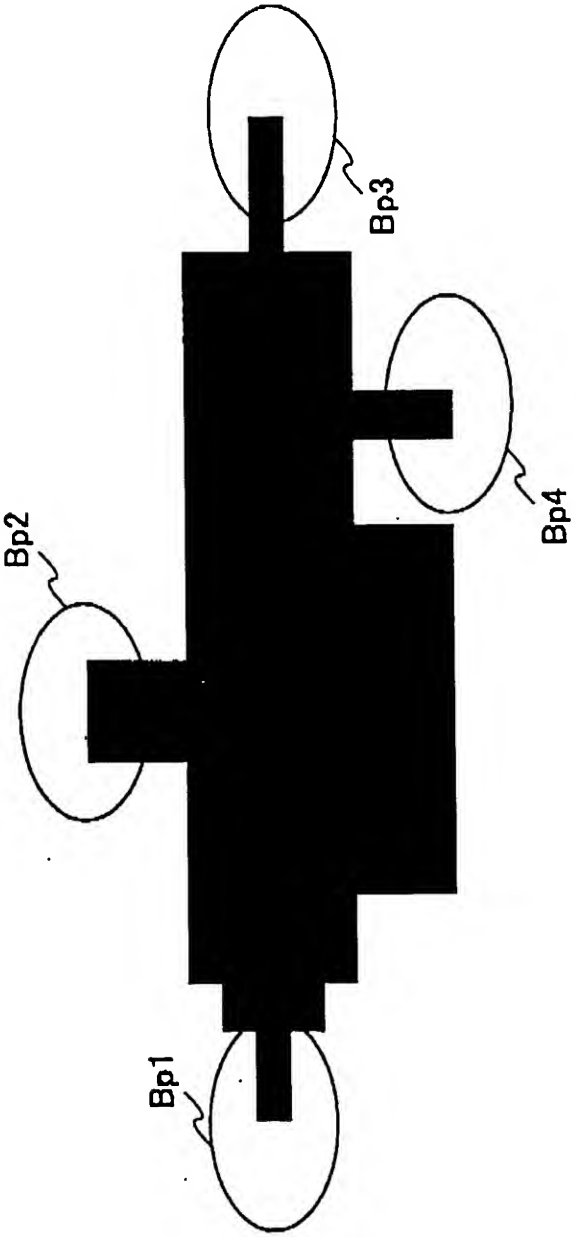


FIG.14

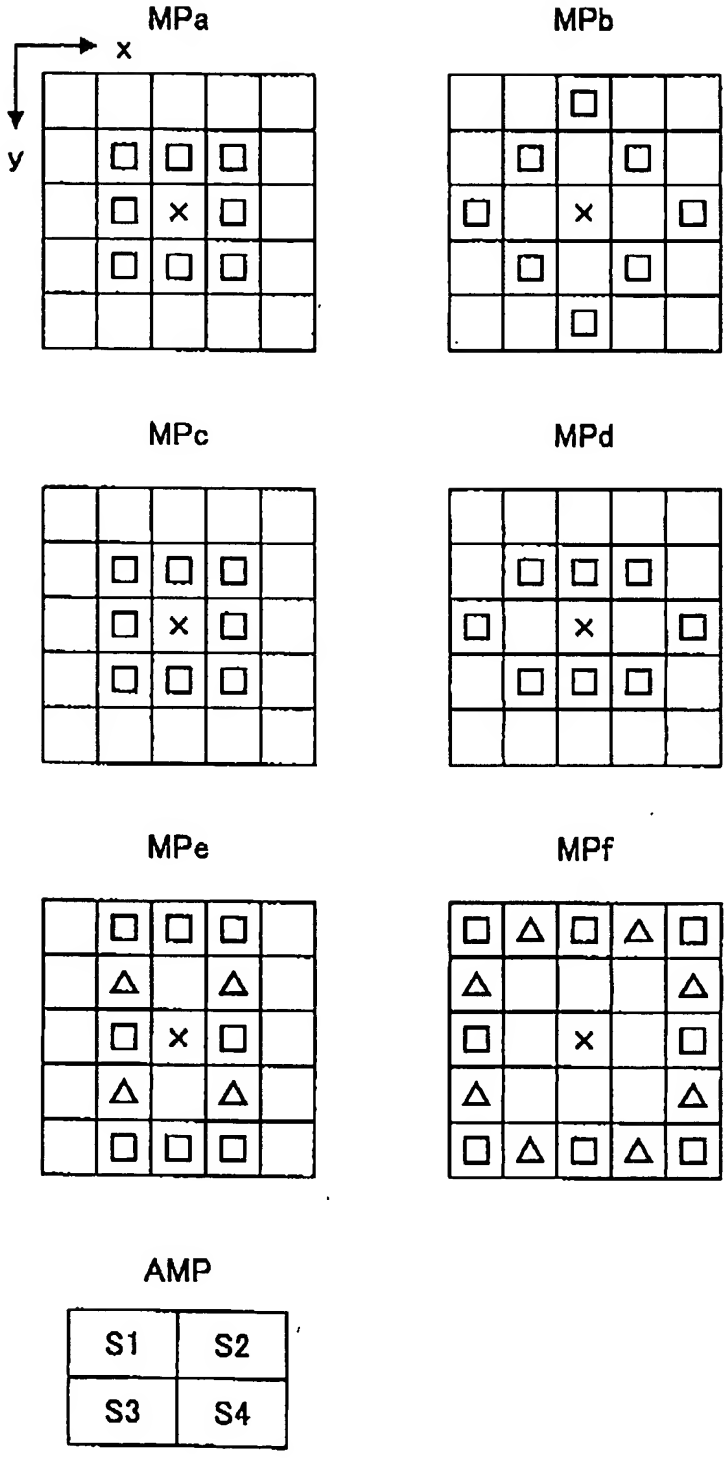


FIG.15A

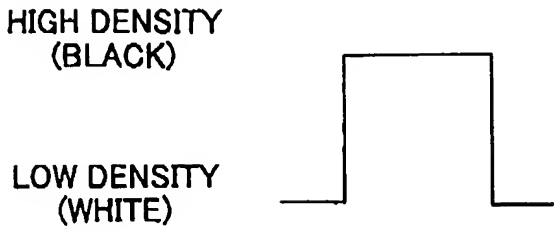


FIG.15B

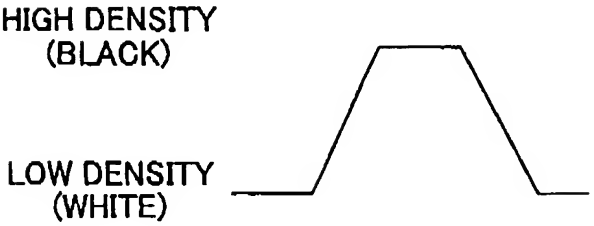


FIG.15C

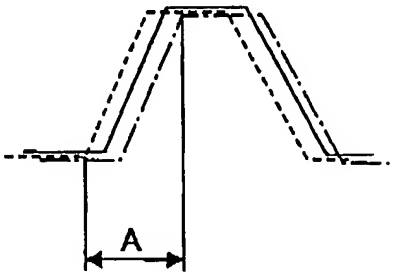


FIG.16

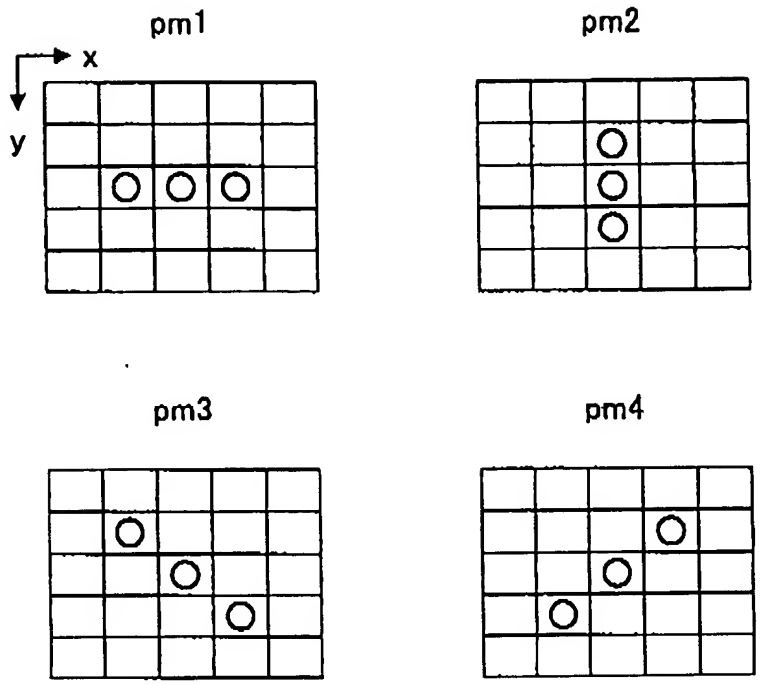


FIG.17

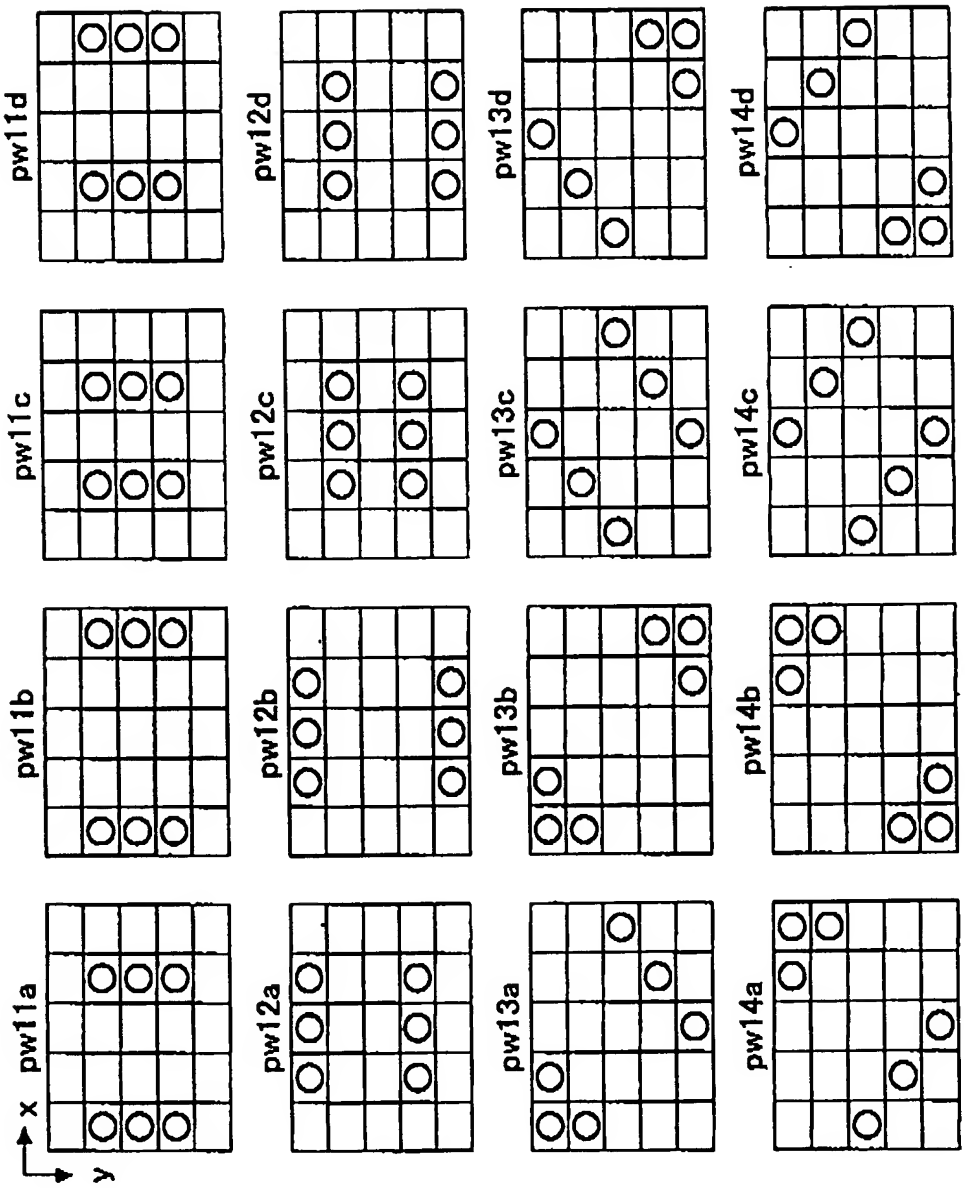

pw11a
pw11b
pw11c
pw11d
pw12a
pw12b
pw12c
pw12d
pw13a
pw13b
pw13c
pw13d
pw14a
pw14b
pw14c
pw14d
x
y

FIG.18

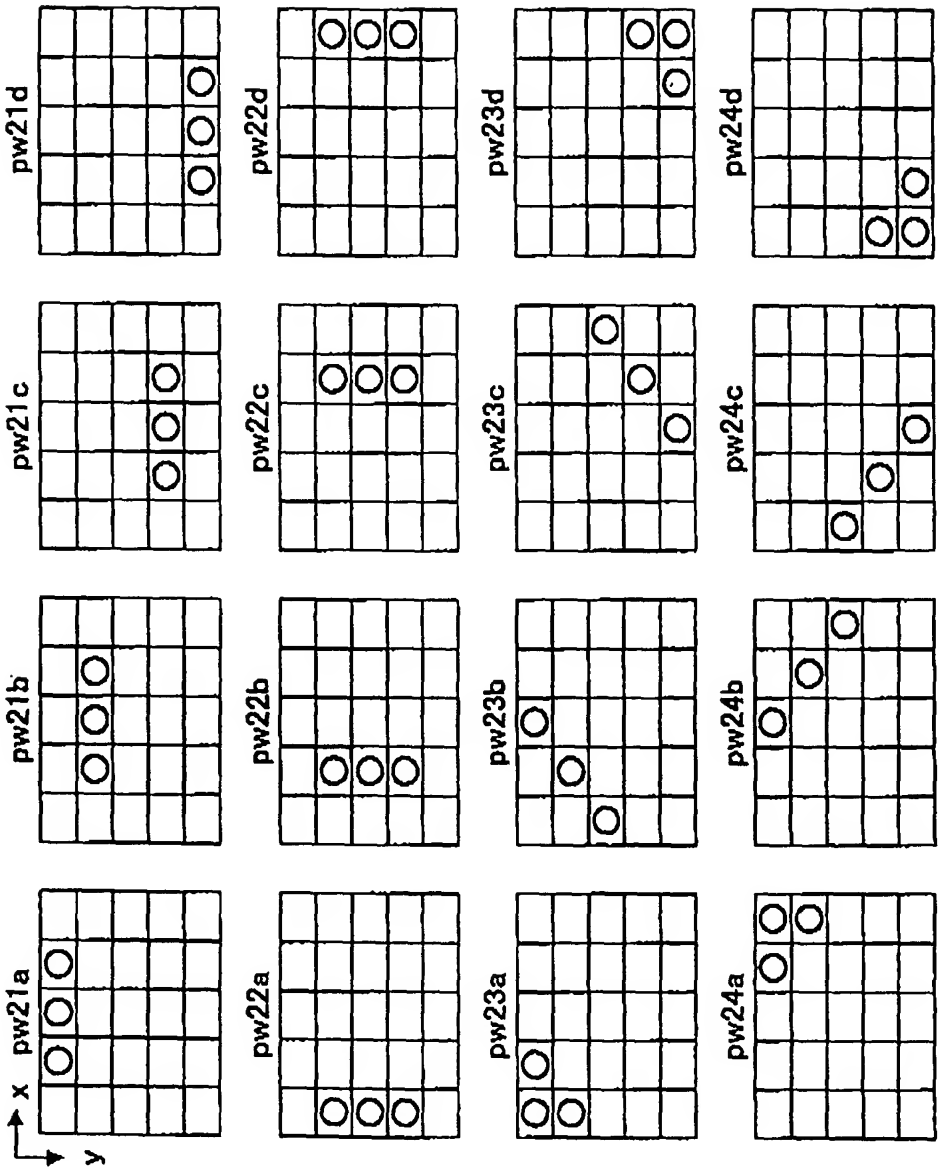

pw21a
pw21b
pw21c
pw21d
pw22a
pw22b
pw22c
pw22d
pw23a
pw23b
pw23c
pw23d
pw24a
pw24b
pw24c
pw24d
x
y

FIG.19

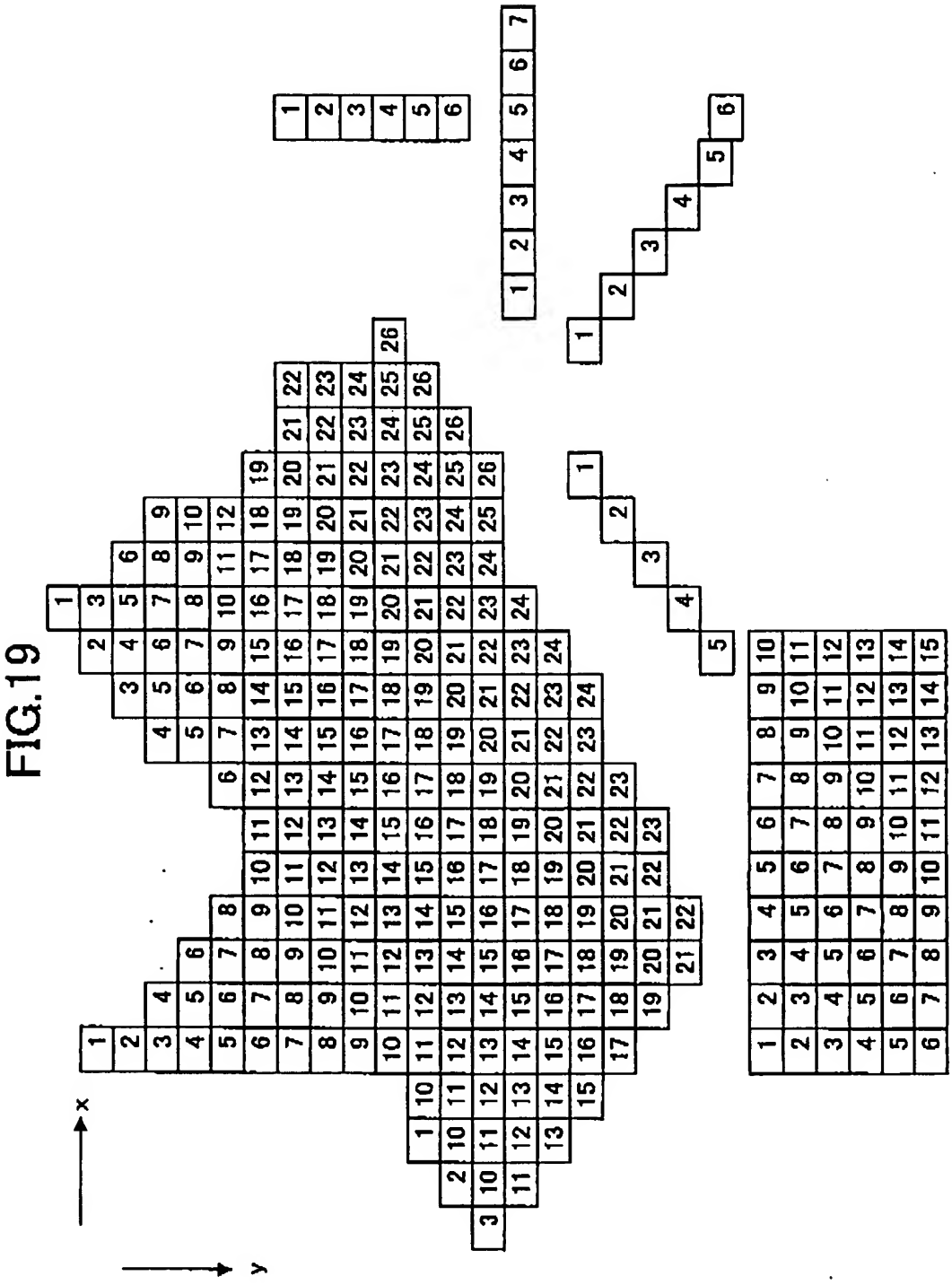


FIG.20

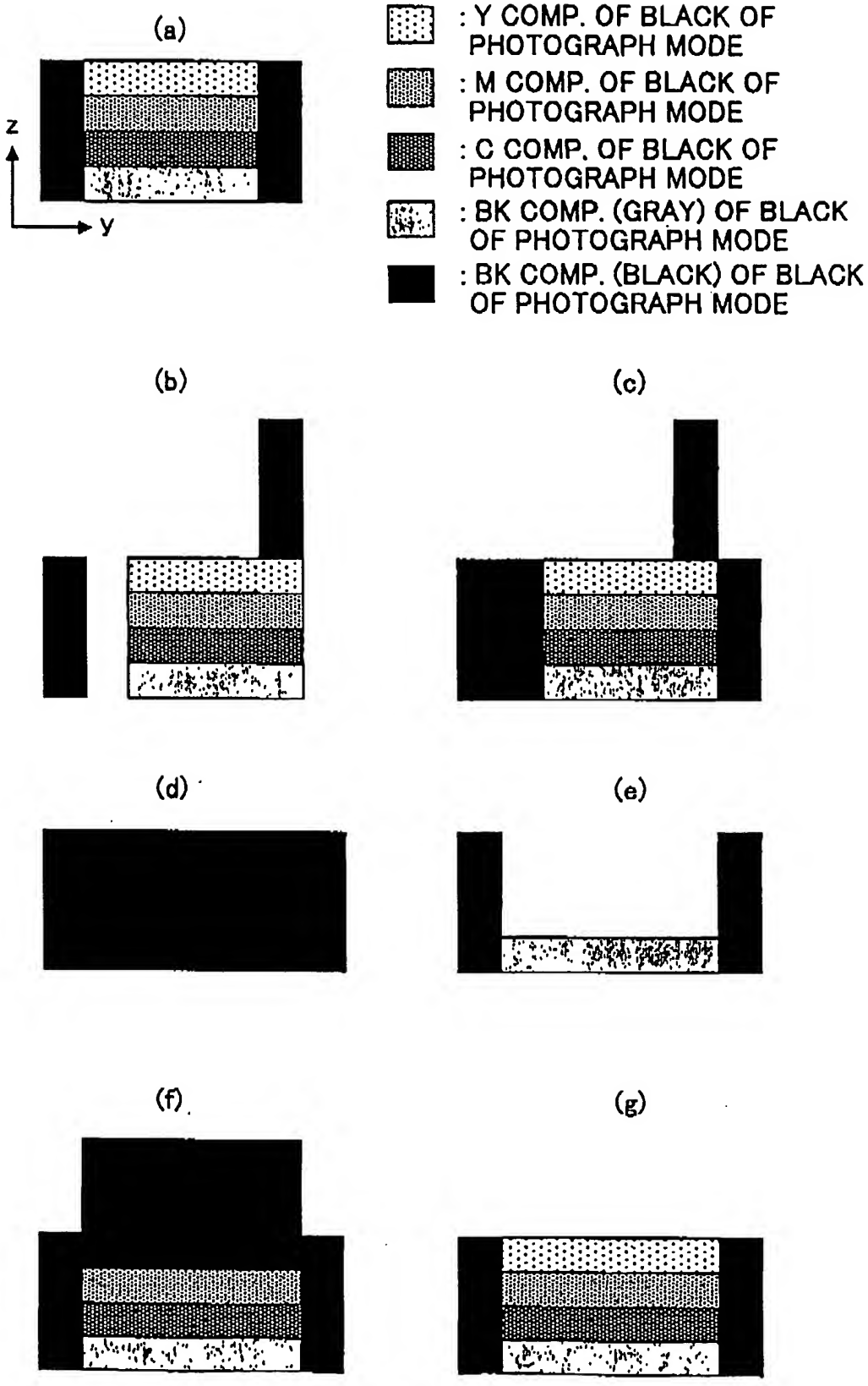

(a)
z
y
: Y COMP. OF BLACK OF PHOTOGRAPH MODE
: M COMP. OF BLACK OF PHOTOGRAPH MODE
: C COMP. OF BLACK OF PHOTOGRAPH MODE
: BK COMP. (GRAY) OF BLACK OF PHOTOGRAPH MODE
: BK COMP. (BLACK) OF BLACK OF PHOTOGRAPH MODE
(b)
(c)
(d)
(e)
(f)
(g)

FIG.21

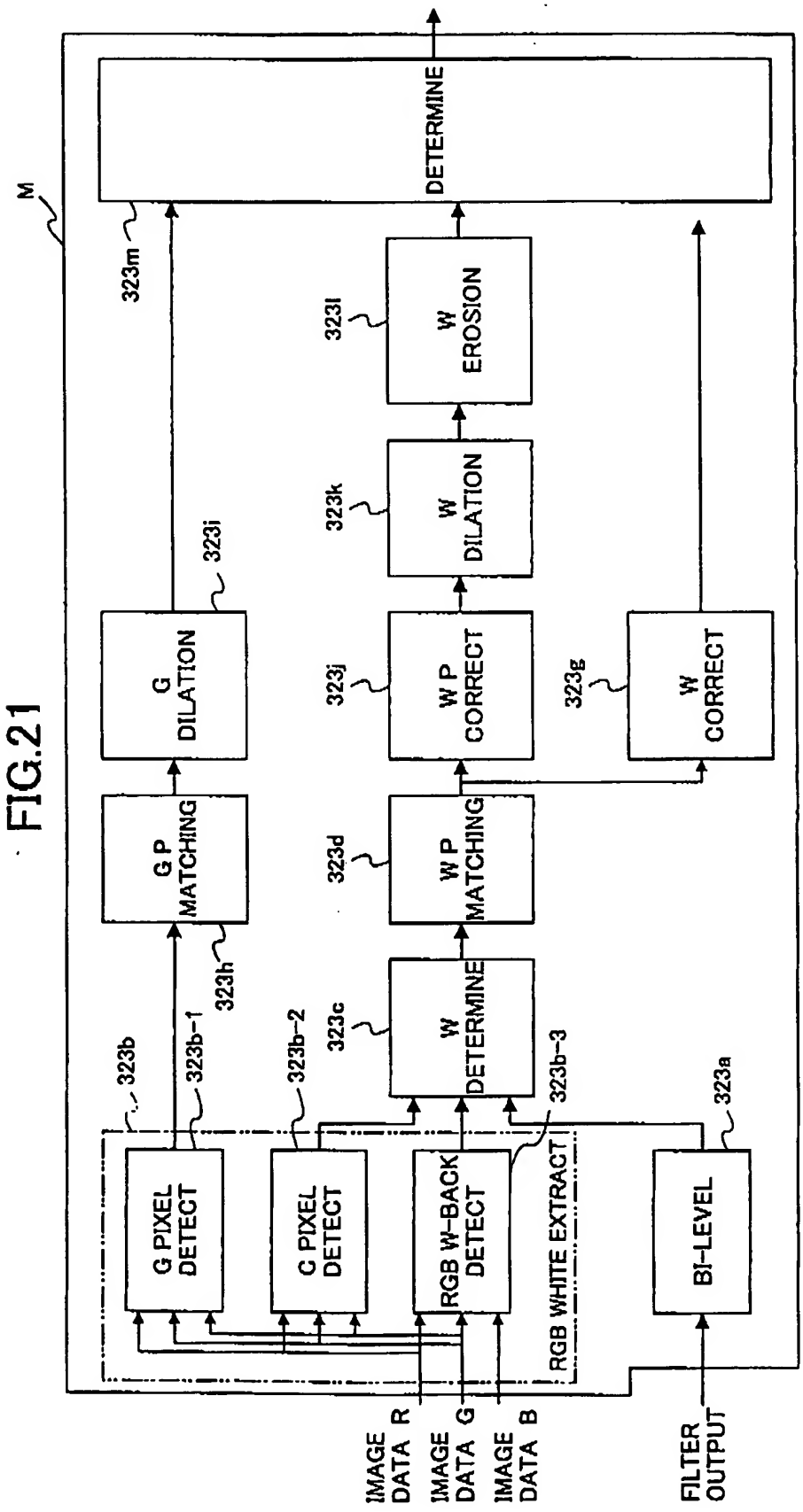
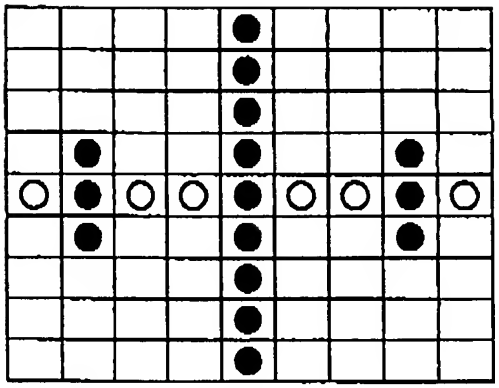

M
DETERMINE
323m
323l
W EROSION
323k
W DILATION
323i
G DILATION
323j
W P CORRECT
323g
W CORRECT
323d
W P MATCHING
323h
G P MATCHING
323c
W DETERMINE
323b
323b-1
323b-2
323b-3
323a
G PIXEL DETECT
C PIXEL DETECT
RGB W-BACK DETECT
RGB WHITE EXTRACT
BI-LEVEL
IMAGE DATA R
IMAGE DATA G
IMAGE DATA B
FILTER OUTPUT

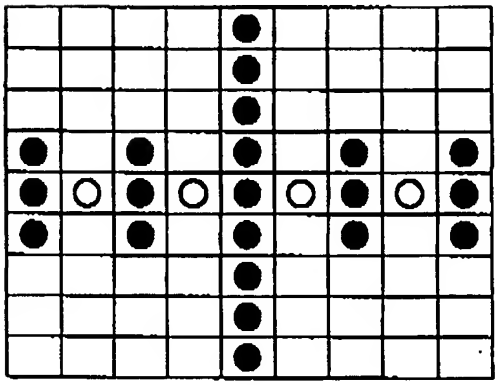
FIG.22

(a)



200 LINE

(b)



300 LINE

FIG.23

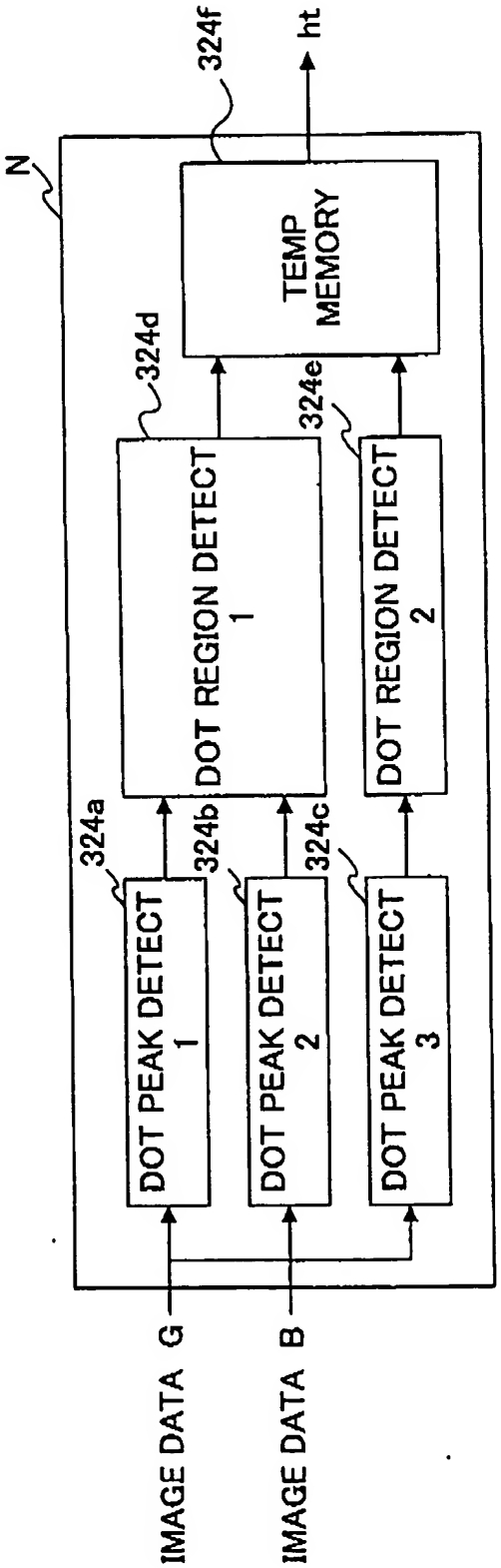
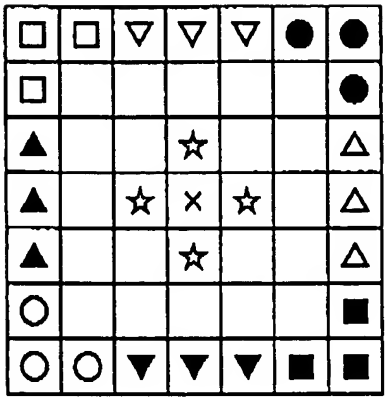


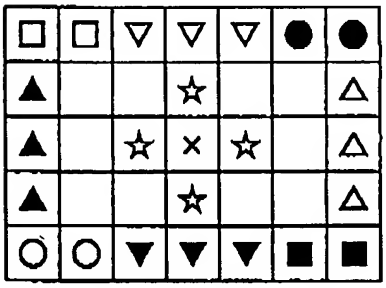
IMAGE DATA G
IMAGE DATA B
DOT PEAK DETECT 1
DOT PEAK DETECT 2
DOT PEAK DETECT 3
DOT REGION DETECT 1
DOT REGION DETECT 2
TEMP MEMORY
N
ht
324a
324b
324c
324d
324e
324f

FIG.24

(a)



(b)



(c)

a1	a2	a3	a4	a5	a6	a7
b1	b2	b3	b4	b5	b6	b7
c1	c2	c3	c4	c5	c6	c7
d1	d2	d3	d4	d5	d6	d7
e1	e2	e3	e4	e5	e6	e7
f1	f2	f3	f4	f5	f6	f7
g1	g2	g3	g4	g5	g6	g7

FIG.25

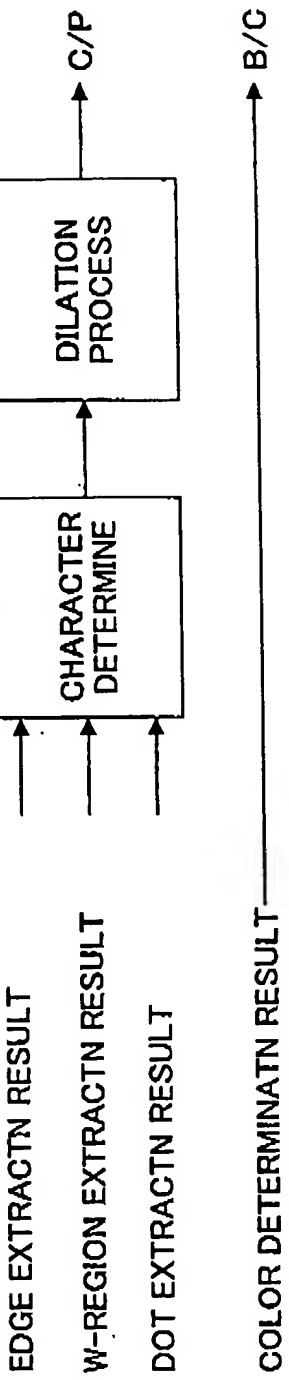

326a
CHARACTER DETERMINE
326b
DILATION PROCESS
C/P
B/C
EDGE EXTRACTN RESULT
W-REGION EXTRACTN RESULT
DOT EXTRACTN RESULT
COLOR DETERMINATN RESULT

FIG.26

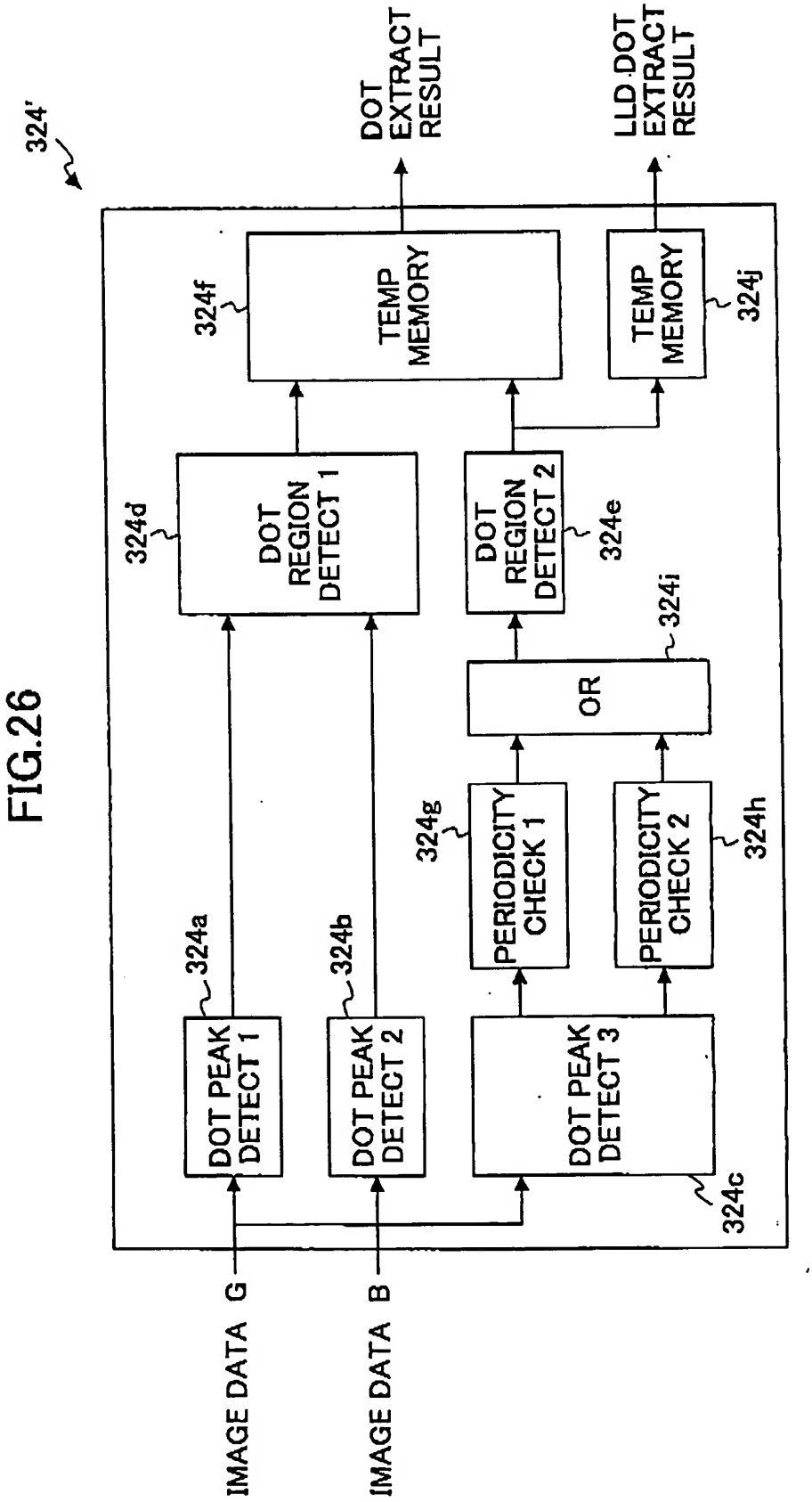

324'
DOT EXTRACT RESULT
LLD DOT EXTRACT RESULT
TEMP MEMORY
324f
TEMP MEMORY
324j
DOT REGION DETECT 1
324d
DOT REGION DETECT 2
324e
OR
324i
PERIODICITY CHECK 1
324g
PERIODICITY CHECK 2
324h
DOT PEAK DETECT 1
324a
DOT PEAK DETECT 2
324b
DOT PEAK DETECT 3
324c
IMAGE DATA G
IMAGE DATA B

FIG.27

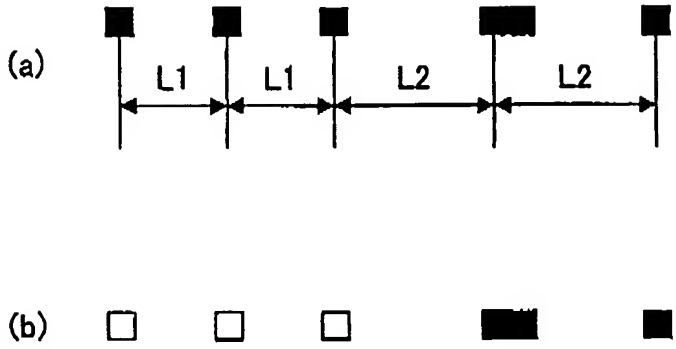
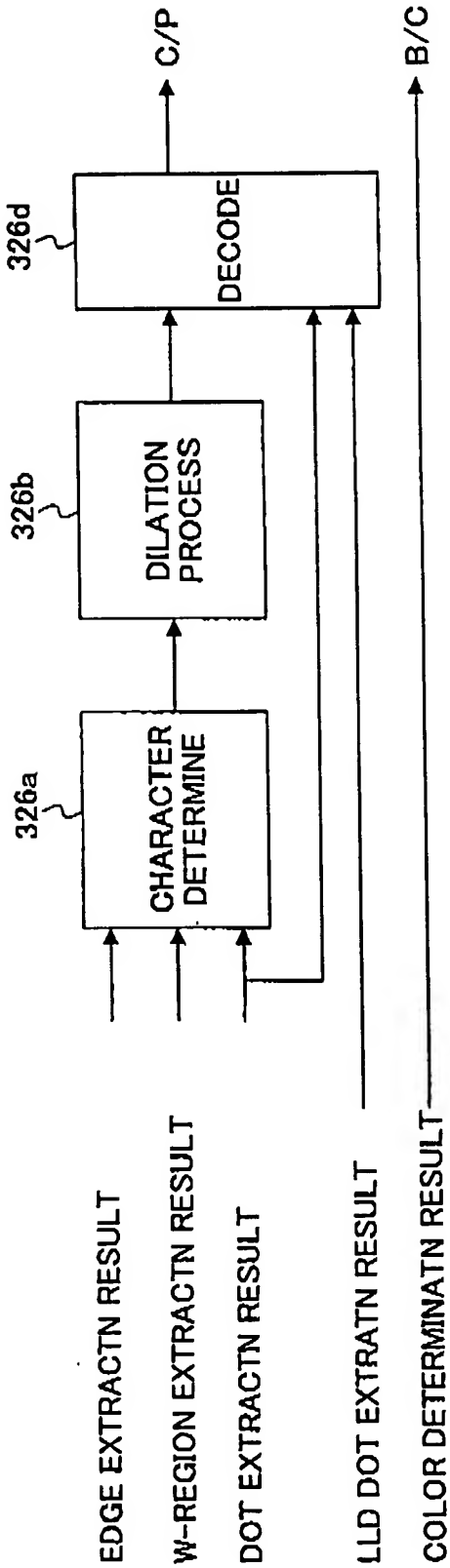


FIG.28


C/P
B/C
326d
DECODE
326b
DILATION PROCESS
326a
CHARACTER DETERMINE
EDGE EXTRACTN RESULT
W-REGION EXTRACTN RESULT
DOT EXTRACTN RESULT
LLD DOT EXTRATN RESULT
COLOR DETERMINATN RESULT